IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	)	Docket No.: 80052US
MARTIN, Laura L., et al.	)	Group Art: 1711
Serial No.: 10/715,157	)	Examiner: MULLIS, Jeffrey C.
Filed: 11/17/2003	)	Confirmation No.: 4293
HOT MELT ADHESIVE WITH IMPROVED PERFORMANCE WINDOW	)	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION PURSUANT TO 37 C.F.R. § 1.132

Comes now Laura L. Martin to declare the following:

I received a Bachelor of Science in Chemistry from the University of North Dakota in 1991, and a Ph.D. in Polymer Chemistry from the University of Minnesota in 1996. I am currently the Principal Application Chemist for the Adhesives and Polymers Technology – Applications division of Eastman Chemical Company, where I am responsible for new product development, technical service, and manufacturing support. Prior to my current position, I was a Research and Development team leader for the Specialty Polymers and Adhesives division of Ashland Specialty Chemical. I have nine years of experience in adhesive technology, including structural adhesives, hot melt adhesives, solvent-borne adhesives, and water-borne pressure sensitive adhesives.

I understand that during the prosecution of U.S. Patent App. S/N 10/715,157 (hereinafter, the Application) the Examiner has cited U.S. Patent No. 5,763,516 to Godfrey et al. (hereinafter, Godfrey) as disclosing a hot melt adhesive composition that

includes certain components similar to those recited in the claims of the Application. However, the adhesive composition of Godfrey also requires between 5 and 20 weight percent of a high-melting, low-viscosity wax, which is not recited in the claims of the Application.

Under my direction and control, tests were conducted to study the effect of adding a wax, as disclosed in Godfrey, to the inventive composition described in the Application. In particular, I made Inventive Composition #4 described in the Examples section of the Application and added 5, 10, 15 and 20 weight percent of a high-melting, low-viscosity wax. The performance window of each wax-containing adhesive was evaluated by determining the onset of fiber tear, the peel adhesion failure temperature (PAFT), and the shear adhesion fail temperature (SAFT). The following results demonstrate that the addition of wax materially affects the novel and basic properties of the adhesive composition described and claimed in the Application.

Preparation of the Adhesive Compositions

Four wax-containing adhesive compositions were prepared according to the procedure detailed in the Examples section of the Application on page 14, lines 7 – 13. The control was the Inventive Composition #4 from the Examples section of the Application. The ingredients used to prepare each composition are listed in Table 1.

Table 1
Components of Adhesive Compositions

Adhesive Composition	Weight Percent of Component in Adhesive Composition				
	Ethylene / Alpha Copolymer	Grafted Copolymer	Tackifier	Wax	Total
Control*	65.0	5.0	30.0	0.0	100
A	61.7	4.7	28.5	5.0	100
B	58.5	4.5	27.0	10.0	100
C	55.3	4.3	25.5	15.0	100
D	52.0	4.0	24.0	20.0	100
* Inventive Composition #4 from Examples section of the Application (no wax)					

In accordance with the Application, the ethylene/alpha olefin copolymer selected for the adhesive compositions was a linear polyethylene with a density of 0.9035 g/mL, the grafted polyolefin used was Epolene C-18, and the tackifier employed was Eastotac 130-R. In col. 7, lines 10–14, Godfrey teaches the addition of between 5 and 20 weight percent of a high melting, low viscosity wax selected from the group consisting of high density polyethylene waxes, Fischer-Tropsch synthetic waxes, and microcrystalline waxes. The wax employed in the Examples of Godfrey was Polyset 2015. The wax used to make test compositions A – D was Marcus 300, another high melting, low viscosity polyethylene wax. Marcus 300 was selected in lieu of Polyset 2015 because Polyset 2015 is no longer commercially available. The key characteristics of Marcus 300 fall within the ranges as disclosed by Godfrey, as summarized in Table 2.

Table 2
Comparison of Godfrey's Wax w/ Wax of Test Adhesive Compositions

Adhesive Property	Ranges Disclosed in Godfrey	Polyset 2015 (from Godfrey)	Marcus 300 (tested)
Viscosity (cP)	< 100 (at 150°C)	15 (at 150°C)	37 (at 140°C)
R&B Softening (°C)	> 80	114	119
Density (g/mL)	0.93 - 0.97	0.94	0.95

Testing the Properties of the Adhesive Compositions

After preparing the wax-containing formulations, the onset of fiber tear, PAFT, and SAFT were determined for each adhesive composition. The onset of fiber tear was determined to assess the impact of wax on the low temperature performance of the adhesive composition. To determine the onset of fiber tear, an aluminum weigh dish containing approximately 10 – 15 grams of an adhesive composition was placed in a 350°F oven for 15 – 20 minutes. After heating, a small bead (approximately 1/8 inch diameter) of the adhesive composition was decanted onto a piece of cardboard with the dimensions 2 inches by 2.5 inches. A second piece of cardboard with the same dimensions was immediately placed on top, finger pressure was gently applied, and the bond was allowed to cool. Samples were conditioned overnight at 70°F and 50 percent relative humidity. The bonded samples were then placed in a refrigeration room at the desired temperature for 30 minutes. The samples were pulled apart by hand and the percent fiber tear recorded. Various temperatures were evaluated to determine the temperature at which the onset of fiber tear occurred for each adhesive blend.

To evaluate the effect of wax on the high temperature performance of the adhesive composition, the PAFT of each adhesive composition was tested according to ASTM D-4498. Bonded samples were made with 40 lb Kraft paper. Bond thickness was approximately 0.010 – 0.015 inches. Bonded samples were placed in an oven and hung with a 100-g weight according to the ASTM method. Initial temperature of the oven was 30°C. Bonds were then subjected to a heating rate of 0.5°C per minute. The time to failure was noted and converted to peel adhesion fail temperature.

In addition, the SAFT of each adhesive composition was tested according to ASTM D-4498 to further study the impact of wax on the high temperature performance of the adhesive blends. Bonded samples were made with 40 lb. Kraft paper with a bond thickness of approximately 0.010 to 0.015 inches. The samples were then placed in a 30°C oven and hung with a 500-g weight, according to the ASTM method. Bonds were then subjected to a heating rate of 0.5°C. The time to failure was noted and converted to SAFT.

Table 3 below presents the results for the onset of fiber tear, PAFT, and SAFT tests for Inventive Composition #4 of the Application (Control) and wax-containing Compositions A-D.

Table 3
Onset of Fiber Tear, PAFT, and SAFT of the Adhesive Compositions

Adhesive Composition	Wax (wt%)	Onset of Fiber Tear (°C)	PAFT (°C)		SAFT (°C)	
			Average	Standard Deviation	Average	Standard Deviation
Control*	0.0	15 - 20	138.0	3.4	-	-
A	5.0	50	123.4	6.7	212.3	3.8
B	10.0	> 72	127.2	7.0	209.9	13.8
C	15.0	> 72	< 72	N/A	< 72	N/A
D	20.0	> 72	< 72	N/A	< 72	N/A
* Inventive Composition #4 from Examples section of the Application (no wax)						

The test results presented in Table 3 illustrate that as the amount of wax in the adhesive blend increased, the onset of fiber tear temperature increased and the PAFT and SAFT decreased. Compositions C and D, which comprised 15 and 20 weight percent wax, were brittle. The onset of fiber tear, PAFT, and SAFT for Compositions C and D could not be tested because the samples fell apart at room temperature. An increase in onset of fiber tear and a decrease in the PAFT and SAFT of an adhesive composition indicate poorer adhesion at cold and hot temperatures, respectively. In conclusion, the elevated onset of fiber tear and the depressed PAFT and SAFT of the wax-containing adhesive blends as compared to the adhesive composition of the Application clearly demonstrates that the presence of wax materially affects the basic and novel properties of the adhesive composition described and claimed in the Application.

I further declare that all statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true, and further that these statement were made with the knowledge that willful, false statements and the like are punishable by fine or imprisonment or both, under §1001 of Title 18 of the United States Code, and such willful, false statements may jeopardize the validity of any patents issued from the patent application.

Date: June 22, 2006

Signed: Laura L. Martin